Rural Dairy Development and the Role of Agricultural Development Projects in Lesotho

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INTRODUCTION

1.1 Background

According to Lesotho's livestock history, including the colonial period, there has been an undulation of exportation and importation of livestock, more especially of cattle, to and from the neighbouring Republic of South Africa (RSA). Table 1.1 shows the post-independence period transactions of imports and exports of cattle.

Table 1.1 Cattle Imports and Exports in the Post-independence Period

Year	Imports	Exports	Net Exports
1966	8724	12976	4252
1967	9937	13353	3416
1968	5239	18353	13114
1969	4355	15299	10944
1970	4730	11408	6678
1971	6869	8656	1787
1972	5028	8918	3890
1973	4067	12894	8827
1974	3046	9225	6179
1975	7944	3503	-4441
1976	33821	1250	-32571
1977	47673	1223	-46450
1978	57787	574	-57213
1979	50133	793	-49340
1980	30496	766	-29730
1981	10740	2090	-8650
1982	7001	427	-6574
1983	10998	219	-10779
1984	6546	452	-6094
1985	8447	747	-7700
1986	7935	357	-7578
1987	3662	772	-2890
1988	1483	29	-1454

Sources: Bureau of Statistics; Lesotho Annual Statistical Bulletin 1978
: Bureau of Statistics; Lesotho Statistical Yearbook 1987

For almost ten years after independence, Lesotho had net exports of cattle to the RSA. From 1975 to date, there has been a dramatic increase of cattle imports and a steep decline in cattle exports resulting in a net import position for Lesotho. There was a sharp rise of imports in 1975 reaching the peak in 1978, followed by a gradual decline thereafter. Figure 1.1 presents a clear picture of the trends. In the early 1980's, the Lesotho government had started a strong campaign against livestock imports. As a result, livestock import levy was instituted in 1984. This and restrictive import permits have been effective in shaping the now apparent declining trend of livestock imports.

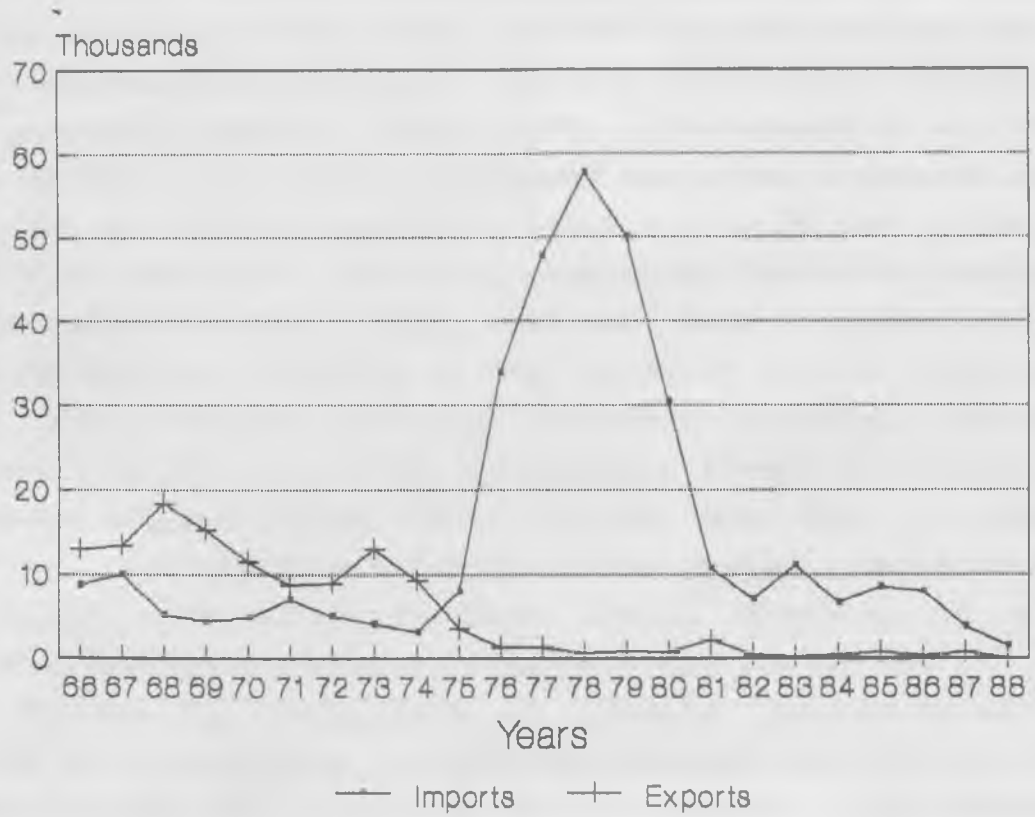

Figure 1.1 Lesotho Cattle Imports and Exports (1966-1988)

The disturbing trend of cattle imports was primarily the result of rising wages earned by migrant mine workers in the RSA. Livestock became a highly attractive investment opportunity.

This was partly because the miners' aspirations are hindered by landlessness and limited investment alternatives while their purchasing power increases. The basic source of the miners' great desire for livestock is the lack of alternative opportunities for use of capital and labour, and their inability as individuals to create such opportunities. This effect is compounded by the fact that as household decision makers, their short periods of stay in the country do not allow them to assess and seek alternatives.

Landlessness, which is in the range of 25 per cent, imposes constraints on crop farming. The low yields on crops complement the indifference amongst the households with land to invest in crop farming. Amongst other problems experienced by Lesotho due to the reversal of its trade position is overstocking that led to range degradation which has recently dominated national policy and research agenda. Dobb (1985) and Swallow et al (1987) are some of the studies which addressed the broad livestock issues.

The majority of Lesotho's cattle are of low grade and are poor milk producers. The poor rangelands caused by overstocking, affect productivity in that, cows are undernourished and do not come to heat as regularly as they normally should. The result is long and irregular calving intervals creating an unsteady economic growth in milk production (Combs and Hunter, 1987). Research evidence shows that rations deficient in phosphorous lead to cows having difficulty coming to heat, and affects their fertility. In dairy farming, timely breeding is a crucial element for the economic viability of the enterprise.

Though the Government of Lesotho intends to establish a viable milk processing industry and support an increase in milk production in the country by Basotho farmers , the prospects are bleak with the traditional breeds that most farmers have (Eckert et al, 1982). Mochebelele's (1988a) view of these indigenous cows, is that because of their poor genetic quality, improvement on management and feeding would not significantly enhance their performance. He further argues that as long as farmers keep the

traditional breeds which rarely produce a surplus for marketing, the growth of commercial dairy farming will be retarded.

For about a decade the Government of Lesotho, through the Ministry of Agriculture, has made attempts to persuade farmers to cull their traditional breeds and purchase exotic dairy cows. The principal objective is to increase the returns per cow, reduce stocking rates and foster rehabilitation of pastures.

Lesotho has four distinct geo-climatic zones, namely the Mountains, Foothills, Lowlands and Senqu River Valley. Because of this diversity, different policy alternatives have been pursued regarding the suitable dairy breeds for farmers based on the geographical area.

In view of these geo-climatic differences, the Brown Swiss breed was, and still is, recommended for the Mountains and Foothills and Friesian for the Lowlands. The reasons being that Brown Swiss, because of its hardiness and ease of adaptability, does better under stress in the highlands than other dairy breeds and that in cold weather they develop a thick hair coating. The Holstein-Friesian breed due to its lack of resistance is suitable for the Lowlands where the weather is comparably mild and the terrain is easy.

In the post-independence period, many large and small scale area-based rural development projects in the different geo-climatic zones of Lesotho were launched through foreign donor agencies. According to Ebernard (1982) these projects were aimed at:

(a) improving crop yield, encouraging fodder and cash crop production

(b) improving livestock quality through improved feeding, breeding and management

(c) providing a more assured subsistence and to increase income derived from crop, livestock and livestock products, and

(d) to support infrastructural development.

1.2 Objectives of the Study

The objectives of the study are as follows:-

1. to review the short history of Lesotho dairy farming and analyze the activities supported by development projects since independence (1966),
2. to Present an appraisal of the revolving fund schemes and their usefulness in maintaining sustainable dairy development,
3. to examine the alternative marketing channels utilized by the small holder dairy farmers, and
4. to present basic data on dairy farming to elucidate the principal characteristics of the small holder dairy farmer in Lesotho.

1.3 Approach to Study

The following procedure was adopted in order to fulfil the objectives of the study. A review of literature on livestock development was undertaken. Secondly, a review of documents on agricultural development projects in Lesotho was completed. The exercise involved assessment of both on-going and completed projects in various areas of the country. Besides personal contacts with government officials, on-going projects were also visited in order to solicit additional information and update documented information.

For specific insights into the general picture of rural dairy development, data were needed to support the study. Data were extracted from the livestock survey completed in 1985 by teams from the Agricultural Marketing Research Project (Phase I) in the Institute of Southern African Studies, and the Research Division of the Ministry of Agriculture. Members were B.M. Swallow, M. Motsamai, L. Sopeng, R.F. Brokken, and G.G Storey. For the purpose of this study, data use was confined mostly to variables which had relevance to dairy development.

Chapter II

DAIRY SUPPORT BY AGRICULTURAL DEVELOPMENT PROJECTS

A summary of the activities for a few of the development projects that had dairy farming and fodder production components are presented. Less focus on the other activities of such projects was made.

2.1 Senqu River Agricultural Project

The Senqu River Agricultural Project was initiated in 1972 and covered parts of the two southern districts of Mohale's Hoek and Quthing. Amongst the broad objectives of the project were to support extension services, improve marketing facilities and the agricultural credit system. Credit was given to farmers through the revolving fund scheme which was administered by the project personnel. The project area comprised 35 per cent Senqu River Valley, 10 per cent Lowlands, 5 per cent Foothills and 50 per cent Mountain region. The project was jointly funded by the Government of Lesotho and the United Nations Development Programme (UNDP). The first phase of the project ended in 1976.

The second phase did not proceed for a number of reasons including lack of funds. Most of the project's experienced staff were lost while a small number of them were absorbed by the Ministry of Agriculture. This was because prior arrangements were not made between the government and the project to accommodate the resident employees. By late 1977, most of the machinery and equipment had been reallocated to the Basic Agricultural Services Programme (BASP) which was initiated by the Ministry of Agriculture.

In 1974/75, five basic dairy courses of four days each were attended by sixty prospective heifer purchasers in the project area. Three of the courses were held in Mohale's Hoek and the other two at the Quthing Merino Sheep Stud which maintained a

small Brown Swiss milk herd. The courses were followed by on-farm visits to assist farmers on various activities including planning fodder production and storage of crop residues. Once the farmers had acquired sufficient orientation, Brown Swiss heifers were delivered to them. New dairy farmers were supplied with a set of basic milking equipment and utensils donated to the Lesotho Government by UNICEF.

Out of ten farmers that purchased project heifers, two proved outstanding while the rest achieved a reasonable level of management. Mills which were originally purchased for fattening trials were offered by the project to dairy farmers for roughage chopping and for grinding grain.

Dairy farming in the project area was not successful. Efforts that were made to stimulate formation of local associations of dairy farmers were unsuccessful. The meetings at which films were shown and lectures given were not well attended. Also, only a few farmers who were classified as wealthier had access to resources which poorer farmers lacked, and they were able to adopt recommended management practices. The problem was that the project personnel lacked the fundamental understanding of the average farmer's perceptions, values, social and economic constraints, and so did not take into account the problems of accession to resources.

During the Senqu project, a number of farmers at Mphaki in the Mountain zone of Quthing district who had owned a few Brown Swiss cattle for several years, requested the project to assist them in organizing an association of beef producers. The proposal was approved and the project offered expertise in drawing up the constitution of the association and its coordination. The senior chief, who was one of the farmers, granted exclusive grazing rights over an excellent area of mountain grazing amounting to 435 hectares to the association.

The association formed in 1975 with 8 founding members was named the Mats'eng Brown Swiss Breeders. The Senqu project provided the fencing materials, a livestock supervisor and two

pedigree bulls at subsidized cost with a binding condition that members should have their herd ear-tagged.

In the 1980's, smaller projects were conceived, and were implemented in some areas which had been covered by the Senqu Rural Development Project. These projects include Mphaki Development Project and Local Initiatives Support Project.

2.2 Mphaki Development Project

In 1980 the Mphaki Development Project which is funded by the European Economic Community/European Development Fund started functioning as an appendage of Senqu River Agricultural Development Project in order to further the objectives with more focus on a smaller catchment area, Mphaki. The project has entered its second phase which is envisaged to run until March 1992. When the Mphaki project was established, it took over all the activities which were formerly supported by the major Senqu River Project including dairy and beef promotion.

Initially, the primary objective of the Mats'eng Brown Swiss Breeders Association was to embark exclusively on beef production. There was no similar association which was geared towards milk production even though there were some individual dairy farmers. The association now boasts a membership of 32 patrons compared to the initial number of 8 founding members.

Currently, the association is going through the reorganization of its objectives and activities. The activities have expanded to breeding and selling of bull calves and heifers to other farmers who are non-members. Through a careful selective breeding programme, the association envisages embarking on dairy operations together with beef production in order to exploit the dual economic role for which the Brown Swiss cattle are commendable. The Mphaki project has provided the basic infrastructure by building a milking parlour and store room for the association. With the assistance of Livestock Division (Dairy Section), a member of the association was trained in order

to assume the daily management responsibility of the farm.

The proceeds emanating from milk sales will be used for the overall running of the breeding activities. Two main reasons led to the reexamination of the association's enterprises. First, it became apparent that the maturity period for feeder cattle to become ready for market is rather long, and during this time they do not generate income. Secondly, it was realized that proper selection of cows with a good production potential, milk can generate a stable flow of income which becomes particularly important during the period when feeder cattle are growing.

Through this strategy of alternative product mix, the farmers envisage achieving two objectives. They seek to achieve stabilization of farm incomes and minimization of risk on investment. The potential for minimization of risk exists since unfavourable price movements in the feeder cattle markets may be made up for by earnings from milk sales. More generally, farmers are enabled to spread the risk more widely hence reducing the negative impact on the entire enterprise.

Perhaps more important from the broad policy perspective is that milk production and beef production enterprises are complementary. The practice is not new to the traditional livestock husbandry and should suit areas where the expertise in management is limited; where specialized dairy enterprises may be prone to many production risks and uncertainty; and where the marketing system has not been adequately developed to serve large scale production units. These features are characteristic of the Mountain areas of the country where the market is thinly traded and the inputs as well as the veterinary supplies are likely to be problematic and untimely.

In other words, the aforementioned mode of production system allows for an efficient use of the informal marketing channels where farmers still rely exclusively on neighbours for disposal of unprocessed milk at the farm gate. With smaller quantities of milk sales, marketing does not become a serious problem and it calls for a minimum business acumen with which small farmers are

sufficiently endowed.

2.3 Phuthiatsana Integrated Rural Development Project

The Phuthiatsana Integrated Rural Development Project effectively commenced in 1984 in the Phuthiatsana river valley in Berea district. It was envisaged that the project would build the first milk cooling and collection centre in Lesotho within the project area. It was further proposed that a large scale dairy farm be established with a herd size of 200 Canadian Holstein-Friesian. Sites for the farm and the collection centre were identified and allocated, but the implementation did not take place. In fact the whole component dropped from the project's plan. So the project plan on dairy support was only partially implemented by being limited to support of individual farmers in conjunction with the Livestock Division.

The main reason which hindered the plan of a large farm and the milk collection centre was the revision of a plan to build a large irrigation dam. It was conceived that the dam would enable the project to irrigate the entire Phuthiatsana valley where fodder would be produced. However, the dam was not built because of prohibitive costs and a potential of accelerated silting.

Before the project started, a group of farmers had already acquired grade Friesian and Brown Swiss cows. Their target was to meet the demand for milk at village level. These dairy farmers purchased 100 grade Friesian cattle and an unknown number of Brown Swiss, mostly from the RSA and the Livestock Division. In-calf heifers were sold to farmers on credit by the Livestock Division using the revolving fund.

When the project started, it was recommended that the rudimentary dairy structure be used as a basis for developing the local market. The responsibility of the project was to improve the standard of husbandry and performance of existing dairy cattle as well as assisting the owners to grow as much of their

own fodder as possible, and to reduce feeding costs. Farmers were trained in small dairy unit management and provided with basic veterinary and breeding services. A total number of 57 dairy farmers were registered. Under the programme, in-calf heifers were sold to farmers through the revolving fund scheme. Two livestock centres were supplied with a Friesian bull and each was used to breed cows for farmers. The milk produced was for domestic consumption with the occasional surplus milk being sold to neighbours.

In general, the dairy farming was doing well even though problems were encountered including the following:-

i) bull service was inefficient because cows were not served at the right time by the right bull type. Therefore calving was infrequent and cross breeding often occurred leading to difficulty in maintaining offsprings of high genetic quality for replacement of the herds;

ii) dairy cows were generally susceptible to disease and disorders which called for veterinary services, the costs of which were a burden to most farmers because of their meager financial resources;

iii) the mortality rate was high since farmers lacked knowledge of the proper husbandry and management of dairy cows;

iv) milk sales fluctuated seasonally due to milk substitutes in some seasons, and this created cash flow problems for farmers; and

v) it was impossible for dairy farmers to make delivery contracts with local traders, and thus secure a guaranteed market for their product. This was because of irregular milk production cycles, hence they remained at a disadvantage in competition with the RSA milk suppliers who contracted with the marketing outlets.

The second Phase of the project which is to run for five more

years beginning in 1990 is earmarked to resuscitate the dairy component, but the plan of establishing a large scale farm has been abandoned.

2.4 Thaba-Tseka Mountain Development Project

The Thaba-Tseka Mountain Development Project started in 1974 and its activities encompassed the entire Thaba-Tseka district. The project was initiated in the belief that the extensive range and livestock population of the area represented by far the greatest potential asset worth developing in that Mountain region. Most of the agricultural activities took place during the second phase of the project which started in 1980 and ended in 1984. The dairy activities of the project comprised purchasing improved dairy breeds and reselling them to farmers while keeping some for the project's dairy unit.

Every other year from 1979, dairy cows were purchased by the project. In 1979, three Brown Swiss bulls and six Brown Swiss heifers were bought from the RSA and sold to farmers at M350 a bull and M200 a heifer. In 1981, four more Brown Swiss calves and one heifer were distributed to farmers. In 1982, the project bull served eight cows that belonged to farmers. In November 1983, four Brown Swiss bulls and ten Brown Swiss heifers were purchased with funds from Canadian International Development Agency (CIDA).

Initially, the project operated three Livestock Improvement Centres (LIC's) in Sehonghong, Thaba-Tseka and Khohlo-Ntso. By 1983 the LIC's had increased to six in number. These are areas established with the primary objective of providing veterinary services to the Mountain areas. The revenue collected from milk sales and from the veterinary services, was put into the agricultural input revolving fund.

During the second year of phase II the project started a share-cropping programme of fodder and fodder crops on an area of 140 hectares. Crops planted included oats, hairy vetch, Japanese

radish, sorghum and maize fodder. The programme centered around the areas of Thaba-Tseka, Mantsonyane, Mohlanapeng and Khohlo-Ntso.

2.5 Khomokhoana Rural Development Project

The dairy programme at the Khomokhoana Project in Leribe district commenced in 1976 when six in-calf Friesian heifers were purchased and sold to farmers on credit. Two Friesian bulls were kept at two locations to service farmers' cows. Sixteen heifers were purchased and bred for the project. Later on, some of them were distributed to farmers at M250 per head under the credit programme.

In order to instill a sense of responsibility amongst the farmers, four conditions had to be met prior to them being given credit. Firstly, a farmer had to be a member of one of the project's associations. Secondly, a farmer had to contribute a 10 per cent deposit before delivery of a heifer with the balance to be paid over three years with ten per cent interest charged. Also, the farmer should have attended at least one dairy cow management training course. Finally, the farmer had to declare a commitment to maintain the cow in good condition and keep production records.

The common practice was for farmers to buy one cow. The project management felt however that the economic conditions and commitment demonstrated by farmers would permit expansion of herd sizes up to five milking cows per farmer. It was felt that expanded herd sizes would make milk the primary source of income for farmers in the area.

With proper management and feeding, the cows were reported to produce up to twenty litres of milk per day. Eleven Friesian bull calves were reared for four months at the project headquarters to demonstrate to farmers the use of milk replacer and farm-mixed "calf starter" meal.

There were courses held for farmers introducing proper

management of dairy cows. A dairy farmers' association was formed by a small number of individual farmers in order to promote a collective effort in dairy development with monthly financial contributions by patrons. Local by-products such as hominy chop, dried poultry manure, maize, wheat and sorghum, were used at the project's head-quarters to formulate a "dairy-meal" ration. This feed mixture was sold to farmers through the project at eight cents per kilogram. A maximum of sixty bags of the dairy-meal were sold per month, with increasing demand each time.

Fodder production was carried out in cooperation with the agronomy section of the Ministry of Agriculture (MOA). Several fodder demonstration plots were planted and each dairy farmer was required to establish some fodder crop. During the project period, two bulls bred about 100 cows in two and half years, and the calves produced were excellent. There were, however, some cases where the bull service was unsuccessful as a means of breeding. The main reasons were that a large proportion of cows brought in for service were either not actually in heat or too weak or small to sustain the bull. This poor condition of the cows was due to retarded growth and poor nutrition. Dairy farmers needed close supervision on a regular basis to feed and manage their cows properly.

2.6 Local Initiatives Support Project

The Local Initiatives Support Project (LISP) in Quthing district, started in July 1987, and its termination date is July 1994. The project is jointly funded by the Government of Lesotho and the International Fund for Agricultural Development (IFAD), Plenty Canada and United Nations Children's Fund (UNICEF).

The project management takes responsibility for the routine project activities. However, strong working relations exist between the project and the Ministry of Agriculture which monitors its activities on-site. This joint management

responsibility was found to be less apparent in other development projects making LISP rather unique. The management of other projects tended to enjoy more autonomy even though they were still expected to submit progress reports. The joint management style, adopted by LISP, is closer to ideals since it is likely to ensure continuity of support to project beneficiaries even after the donor support has terminated.

The broad objectives of LISP are to promote farm and non-farm income generating activities through the support of "indigenous" initiatives. The farm enterprises supported by the project include broilers and layers, a piggery, dairy farming and the development of communal gardens. Non-farm economic activities include water supply, carpentry, metal work, a tannery and leather work, brick making, tailoring and knitting.

Group Formation and Beneficiaries

In view of the limited capital base for the rural poor, the project facilitates acquisition of credit to groups. The groups are organized according to the types of economic activity for which assistance is sought. For instance, farmers who require funding for acquisition of dairy cows are considered jointly as a unique group. In like manner individuals interested in other enterprises are formed into unique groups.

More than 80 per cent of the beneficiaries in the project area were women. However, with respect to dairy farming, female domination was less apparent. Fifty nine per cent of beneficiaries consisted of female participants. No firm conclusions can be made about the ultimate participation ratios since the project is still in progress. The preliminary indications are that women will benefit more from the project since most of the activities tend to be female dominated.

Credit Arrangements

Contrary to the practice of other former projects, LISP does not directly administer an independent credit scheme. The project routinely follows up on the farmers' groups and organizes their training according to economic activity. It also assesses the feasibility and credit worthiness of groups prior to a submission of a loan application to LADB. There are two main advantages derived by farmers for acquisition of credit through the project. First, the rigid credit worthiness conditions are not so strictly applied. Second, the interest on credit acquired through project efforts is relatively lower than the interest charged by LADB to independent borrowers. In the first half of 1989, the Mokotjomela Dairy Farmers Association at Mount Moorosi benefited from the project's credit assistance. A loan was acquired to purchase 18 Friesian dairy cows from the RSA farms through the Livestock Division.

Even though credit conditions are more relaxed, the project enforces preliminary measures to ensure a high repayment rate. Groups are urged and assisted to raise adequate collateral before lodging an application for credit. The project advocates simple means for groups to raise collateral. These include "setokofele", meaning a fund-raising, recreational function which involves sale of food and home brewed beer. The practice has merits in that people are familiar with it, and it tends to favour groups who have limited alternative income sources.

Equity and Allocation

The means for appropriation, use, and distribution of project's services and benefits has profound equity implications to the society in the area. The impact of the project amongst different interest groups will determine the level of, and the course that will be taken by the dairy development in the area. The rules sanctioning the allocation of credit to groups is one

of the standing landmarks of the project's impact. It is clear from the document that the project is cautious of equity considerations, that is, its beneficiaries are the poorer and vulnerable groups who are primarily women. The project's success should hence afford the society an improvement in income distribution which is one of the paramount measures of performance.

2.7 Canada/Lesotho Dairy Development Project

The project was conceived as a result of bilateral agreement between the Government of Lesotho and the Government of Canada. Since its inception in 1985, CIDA (Canadian International Development Agency) has participated in the implementation of the project representing the Government of Canada in Lesotho. While there is nothing novel about the project, it is in many ways unique from the rest of the projects by virtue of its specialized role of dairy development.

The activities of the project are adequately integrated with the programmes of the Ministry of Agriculture through its Livestock Division. Two main factors appear to have played a key role for the proper integration of the project. First, intensive dairy development is very new to Lesotho. This factor gave the Agricultural Personnel enough time to study mistakes made in other African countries where massive and inappropriate dairy establishments were set up through aid projects. Lessons and failures of other local projects which had a dairy component in their activities were also taken into account.

A foresight in planning, helped in avoiding inefficiencies which were faced in a country such as Swaziland. A model of large donor funded dairy farms was adopted in the late 1970's in Swaziland. Serious problems were encountered leading to costly failures. The domestic conditions did not permit the operation of large farms on an economic basis as had initially been anticipated. The Swazi government did not have the financial and

management capacity to maintain their existence; the sizes of herds, 200 Canadian Holstein per farm, based on a zero-grazing system were inappropriate; the farms were overly mechanized; and incompatible with the environment and local resource base.

In the 1970's, a proposal for a massive project similar to the Swazi model was deemed by the government of Lesotho to be prematurely conceived given the country's background. Three main factors influenced the decision. It was found that the land tenure problems, risk involved, and the cost to both the Government of Lesotho and CIDA could not warrant the venture. In the sequel of the CIDA mission to Lesotho in March 1982, a new project of a more modest scale was initiated. This culminated in the Canada/Lesotho Dairy Development Project which commenced in 1985.

The second reason which renders the Canada/Lesotho Dairy Development Project different from other projects is that it is specialized and also not area specific by design. Its broad activities are specially designed for dairy development through out the Lowlands. Efforts are not spread on enterprises which are not related nor complementary. Its broad design permits coverage of most of the Lowlands while other projects are normally confined to specific and small areas. The large coverage radiates equitable development for a wider number of people which area-based projects could otherwise ill afford. This model has already shown signs of success on a national scale, and a necessary corollary should be an integrated marketing system.

The Canada/Lesotho Dairy Development Project came to the end in 1989 and entered Phase II in January 1990. The two phases, while complementary, differ by level of emphasis for which support is extended.

Phase I

During this phase, human and financial resources were largely committed to infrastructural and institutional

development, with an objective of establishing basic foundations to ensure the future expansion of dairy industry, based on the premises of privatization and of commercialization.

During the project's five year period, a dairy plant was registered as a private entity named the Lesotho Dairy Products Ltd (LDP). The LDP, which has a larger processing capacity, replaced the government owned plant whose operating capacity was limited. After the new plant was opened, it became imperative that aggressive marketing initiatives be undertaken to expand sales in view of the competition from foreign companies.

A commercial delivery system based on insulated trucks, in addition to open trucks, was instituted. The small open trucks are used for shorter trips, while the bigger and insulated trucks are operated on longer delivery routes. This marked a new era in the milk marketing system, and happened because the plant management had begun to lobby for protection against foreign competitors. This also necessitated reorganization of the industry, and raised the need for legislation and new policies.

Whereas measurable successes were achieved, a number of operational obstacles were encountered at the processing facility. The processing capacity of the plant, 10,000 litres per day, was under utilized. This was because the size and specifications of the storage room imposed bottlenecks in the production process. Accumulated milk intake over the weekends amplified the problem.

In summer, 1989, the high intake of milk, made up of local production and imports, created problems arising from limited storage capacity. In order to ease the problem, "excess' raw milk was exported to Ladybrand in the RSA. At the same time, the plant continued to import raw milk in order to meet the contractual obligations in view of retaining contract in winter months when local production is low. Failure to honour contract would cause problems in winter when imports are most needed.

In summer, "excess" milk was exported at a price below cost. However, the practice was economically rewarding because of two

reasons. Firstly, gains from importing raw milk, and from increasing plant utilization, offset the losses made by reexporting the "excess" in summer. Secondly, since 1988, it became more costly to reconstitute milk powder and butter oil, than importing raw, fresh milk from RSA. This was due to a substantial increase in the international market prices of butter oil and milk powder which were used to make up for shortage in production.

Besides positive business gains, a number of questions should be answered regarding long-term economic implications for dairy industry. Some of the key questions, which need to be addressed are: for how long a period of time will Lesotho continue to rely on imports to meet domestic requirements? What are chances that local dairy industry will be economically viable in future, if all milk is to be produced locally? This raises the issue of conflicting interests between producers and consumers with respect to acceptable price levels. What are chances that high local prices will promote inefficient producers and misdirect use of resources? These questions do not fall within the scope of this study, but they have profound policy implications which are relevant to the development of the industry.

National Dairy Board

One of the notable landmarks in the Lesotho dairy industry, initiated by the project, is the formation of a National Dairy Board (NDB). The NDB became functional in September 1988, and since its inception two main issues which shape the industry have been addressed. Import regulations were prepared. Through these, import quotas were instituted and contracts signed for raw milk being supplied to the processing plant while free access to the markets has since been subject to control. A pricing policy has also been formulated in view of paying domestic farmers prices commensurate with their costs.

The functions of the Board are to produce and implement plans and programmes related to: milk collection; milk processing; milk distribution; milk pricing policies at the farm, wholesale and retail levels; control of imports and exports of raw materials and dairy products; and development of an infrastructure to meet future requirements. The above mentioned developments, because of their nature, had to be legislated. As a result, the NDB worked closely with the Department of Economics and Marketing, of the Ministry of Agriculture.

Milk Collection System

Outside Maseru district, structures were made to facilitate raw milk collection. Three milk collection and cooling centres were built in Leribe, Butha-Buthe and Mohale's Hoek districts near the administrative towns. The centres play a pivotal role in facilitating the marketing of milk through formal marketing channels. There is evidence of a steady increase in milk production, attributable to the direct project participation by stimulating supply. Construction of additional collection centres is envisaged during Phase II of the project.

Phase II

Phase II is geared to crystalize Phase I work with more emphasis on support for extension services beyond Maseru district. Phase II activities can be broadly outlined as covering the following areas: the strengthening of the National Dairy Board and to refine upon its functions, the construction of offices for the National Dairy Board, the expansion and modifications to the dairy plant, and more importantly, the strengthening of extension services and programme through an increase of milk collection centres, fodder production and expansion of artificial insemination services. To facilitate these, limiting factors, such as transportation and human

resource development have been considered in the overall plan of operation.

Milk Collection Centres and Farmers Associations

In addition to the three milk cooling and collection centres already in place, two more are to be built at Teyateyaneng in the Berea district, and Mafeteng. Elsewhere, if farmers' associations attract the necessary concentration of producers, a provision exists for the project to supply cooling tanks, provided the associations demonstrate their commitment by building the structures. Three areas have already been identified in Maseru where farmers' concentrations exist. The areas are Mazenod, Masianokeng and Qeme.

Hay Storage Sheds

The present policy pronouncement is for farmers to grow their own fodder, however, because of present circumstances, imported fodder is greatly relied upon. Individual farmers purchase small quantities while the ideals of economics suggest bulk purchasing to be more cost effective. To the contrary, associations are in a better position of cutting costs since pooled financial resources increase the purchasing power. After the establishment of milk collection centres, a potential for central bulk purchasing of feed has been demonstrated. The achievements made by the Leribe Dairy Farmers' Association bare testimony to this new development.

The Leribe Dairy Farmers Association purchases feed in bulk and sells it at a marginal profit to members at prices lower than the local retail prices. Besides cutting costs to patrons, the Association also builds up funds to finance the Association's activities and the collection centre. It is envisaged in Phase II that the project will use the Leribe Dairy Farmers Association

as a role model for replication in other areas. In order to facilitate the process, the project is committed to building fodder storage sheds for associations in the locations with collection centers. According to plan, ten associations will be assisted in growing fodder on areas amounting to 20 hectares per association, and all costs will be borne by the project.

Chapter III

GENERAL ASSESSMENT OF DAIRY DEVELOPMENT SUPPORTED BY PROJECTS

Since independence, when many development projects were introduced in Lesotho, a number of achievements have been made. The key question is whether the agricultural enterprises assisted by the projects achieved sustainable performance at the termination of the project- tied support. Since the question addresses a much bigger problem, which runs across various agricultural enterprises, it will not be broadly covered in this document. Rather, assessment is limited to dairy support.

3.1 Transformation of Traditional Socio-Economic Systems

Ways are known through which productivity can be increased. The common policy pronouncements seek the transformation of the traditional herding systems and the adoption of `modern' production and marketing systems. However, this could be a very misleading formulation. This arises because, in reality, some of the key problems characteristic of the African livestock sub-sector arise primarily from attempts to superimpose inappropriate modern methods without regard to the nature of the environmental, cultural and socio-economic structures already in place (Raikes, 1981).

The nature of the existing systems determines the acceptability and the rate at which modern systems can be assimilated successfully. That is, the indigenous traditional systems of herding are long past the primitive stage. Rather, they have evolved over a long period and represent a complex adjustment to the environmental and cultural structures. Necessarily then, traditional systems should be taken into account before any implementation of policies based on the notion of modernity and transformation.

Hasty attempts to change the traditional system based on

routine modern concepts may not ameliorate farmers but, on the contrary, impoverish them. Based on a similar logic, the modernization of dairy farming in Lesotho requires the utmost care. Dairy farming is a specialized enterprise, the success of which depends on its institutionalization into the prevalent environment and socio-economic systems.

Donor funded development projects have had a significant input in supporting dairy farming in a number of ways. But there were also failures due to an insufficient appreciation of Basotho farmers' perceptions of the projects, and how they are motivated by them. Two interrelated factors formed the basis for the misunderstanding. The key element is the short duration for which donor supported projects are funded. The second ingredient is the innate motivation necessary to attain target goals within a short period of time, and the disregard of fundamental elements of existing systems which should be carefully studied. When this happens, the goals conceived by projects are likely to be different from the feasible long-term goals and aims of the traditional farmer. In this sense, the question of optimal results is meaningless in the long-run since farmers would likely remain poor.

3.2 Acquisition of Improved Cows

Amongst the main objectives of introducing improved livestock in Lesotho is the need to create an impetus for a commercially inclined production system. Increased productivity and returns per animal is the prime, and intermediate goal set in order to achieve the end objectives. That is, replacement of low yielding traditional cows by high yielding exotic cows. As observed, development projects have played a meaningful role in assisting farmers with the procurement of dairy cows in several areas on a group basis. The strategy fostered development centered around the cooperative spirit engendered in the farmers.

The projects however did not consider breeding activities as

part of their agenda in order to foster self-reliance in the supply of improved cows. All cows were purchased either directly or indirectly through the Livestock Division of MOA from the RSA. This purchasing has promoted dependency on the RSA and frequently hampered the expansion of dairy enterprises due to rapid price increases. The average price for a heifer had increased from M400.00 of 1984 to M2000.00 by 1989. This amounts to a 500 per cent increase in the prices per head over a period of 5 years. Indications are that this market trend will continue if it is not contained through import substitution and the establishment of self-reliant breeding programmes.

It is not uncommon for farmers in Lesotho to trade cattle amongst themselves. This practice also prevails amongst dairy farmers who sell cattle to new entrants. Prospects of success are not very bright for new farmers who rely on these sales. Maintaining a high level of breeding performance is not guaranteed amongst the farmers with their prevalent means of production. Since this does not provide an immediate viable alternative source of cows for new farmers, a need arises for the establishment of a national breeding herd. Opportunities also need to be explored for the identification of some of the farmers who are better managers as an alternative source of heifers. Through close monitoring, it is envisaged that the latter alternative is feasible and should discourage imports. The Mats'eng Brown Swiss Association at Mphaki is a fine example of a unit that has already endeavoured to sell Brown Swiss heifers to other farmers. It should perhaps be noted that a firm support for such programmes is essential and these programmes should be monitored frequently by the dairy extension personnel.

3.3 Training for Dairy Management

Accepting that dairy farming is a specialized livestock sub-sector, proper training is the elementary factor that sets the basis for improved husbandry. FAO (1980) notes that

> .....in other dairy development schemes, it has been found that farmers who have never owned traditional cattle before make excellent intensive dairy farmers, as they have no preconceived ideas about the feeding and management of their animals, and rely entirely on the advice of their extension officers.

A similar sentiment is shared by the Livestock Division in Lesotho based on the extension experience. In conversation with the Chief Dairy Officer, Mr S.V. Monts'i, it was revealed that women tend to be the most successful dairy managers. Because women do not have prior misconceptions about dairy management, it is argued, they adhere to extension advice and are more receptive of new ideas.

By engaging in the training of dairy farmers based on the on-site (farm) approach, the agricultural development projects played an unprecedented role. Although the Livestock Division has had dairy officers in some districts since the mid-seventies, they have been unable to reach most farmers. In some instances, it is only recently that the dairy officers have been posted in the districts. Responding to the apparent need for increased extension services, CIDA has extended financial and personnel support to the Lesotho government.

The difficulty with most projects has been a lack of specialized dairy technicians, a difficulty that continues to exist nation-wide. The deficiency arose right from the conception stage of the projects' plans and activities. An exception to this weakness is the Canada/Lesotho Dairy Development Project. Evidence exists that the projects were frequently not designed to accommodate dairy development but ended up by doing so during the implementation stages. This extension of the projects' aims posed problems since such projects were forced to rely on extension agents who did not have formal training and expertise in dairy husbandry. The recent ongoing campaign by the Ministry of Agriculture to organize training sessions at the farmers' training centres and project sites has alleviated some of the problems. Of much seriousness

is the lack of consultation between the projects' personnel and the Ministry of Agriculture which is the lead ministry.

3.4 Capital and Input Supply

Because of poor rangelands, zero-grazing practice has become increasingly common for dairy management. For areas adjacent to the urban and semi-urban areas, reliance on stall feeding is generally attractive and expanding. Lack of pastures is probably the most important reason for adoption of a zero-grazing management style in these areas. The preliminary results from a forthcoming study (Mochebelele, 1990), show that 74.7 per cent of dairy farmers rely exclusively on a zero-grazing feeding regime. Only ten per cent relies exclusively on grazing, while the remainder (15.3 per cent), depend on grazing as well as stall-feeding. But the remote areas of the country tend to be secluded from the markets of dairy inputs and have a limited choice of marketing outlets where inputs are purchased.

Some development projects like Khomokhoana have played an important role by introducing alternative concentrate feeds which were made from local by-products. While such feed inputs had no definite grading in terms of nutritive value, the example set by the project could be further developed on a more rationalized basis by other projects.

Besides the need for the production of alternative feed concentrates, some projects assisted farmers by selling common concentrates, such as lucerne and dairy meal purchased from the RSA. Fodder production by farmers was the emphasis of the projects, with a view to maintaining self-sufficiency in feed supply at the local level, but this goal has not proved attainable.

Access to supply of inputs, both veterinary and feeds, in the remote areas and a lack of capital hinder the rate of advancement in many ways. The problems of financing, of saving and of credit are not special to dynamic agricultures

experiencing technological advancement and modernization. For a small farmer in the dominantly traditional agricultures, the basic limitations start from an acquisition of the bare minimum of finance to support production.

In most agricultures the prime source of farm capital is direct investment generated from the income stream of the individual farming unit or household. Usually this is not the only source of finance but perhaps a dominant source compared to borrowing from formal and informal financial institutions.

The importance of internal financing is more pronounced in low-income static areas, than in relatively high-income dynamic areas. Two reasons are considered responsible for the differences in preference for sources of finance (Mellor, 1974). Firstly, in a low-income agriculture a static technological base does not permit or provide the basis for expanding financial needs. Secondly, in a predominantly low-income agriculture, the static income base does not strengthen the repayment basis for expanding borrowing nor even improve the credit worthiness. From the household budget survey (1988) by the Bureau of Statistics, it was found that, in Lesotho, only about 5.5 per cent of households had a bank loan of one form or another. This figure shows the general unwillingness to borrow, and demonstrates that for most entrepreneurs the capital base is limited to the owner's assets. Ironically, the limited owner's capital base becomes the ultimate constraint to agricultural development.

Agricultural development projects in Lesotho have been active in releasing some of the small farmer constraints associated with the arguments advanced above. Through the establishment of revolving fund schemes, farmers are provided with an alternative financing scheme which does not emphasize the strict credit-worthiness criterion adhered to by the formal credit institutions.

A new development, championed by the Local Initiatives Support Project in Quthing, has assisted farmers in raising funds through traditional income generating functions, such as

"setokofele", which are familiar to them. The proceeds are used as a collateral for borrowing money from the agricultural bank where farmers are encouraged to assume a group liability on the loan repayment.

If incomes are low and prone to seasonal and annual fluctuations, internal financing becomes insufficient and the need for outside borrowing is inevitable. But recurrent borrowing also adds to future income problems due to the burden of added interest, resulting in a decline of spendable incomes. To avoid repayment burdens, where this is feasible, the development projects have frequently demanded large deposits from the farmers and assisted them with marginal funding.

3.5 Breeding and Genetic Quality

In Lesotho, both natural bull service and artificial insemination (AI) are used for breeding. Of the two methods used, the direct bull service method is traditional and the most common. However, the Canada/Lesotho Dairy Development Project is an exception to this while other projects opted for keeping improved bulls which were used to service the cows brought in by farmers. Problems with this practice were associated with distances from the service centres. Some farmers cannot reach the bull service centres in time when cows come to heat. Under the circumstances, farmers have no option but to indiscriminately breed cows with mongrel bulls in their respective areas.

The result has been such an increase in cross-breeding, that maintaining a pure bred herd becomes impossible. Another problem with the bull service method is that the bulls were in some cases highly under utilized. Cases exist where a bull bred just eight cows in a year. Ordinarily, this means that the high cost of maintaining the bull was not economically justifiable even though it could have achieved a social objective.

Artificial insemination as an alternative method tends to solve the problem of distance under well coordinated transport

arrangements. Whereas the AI facility is of recent use in Lesotho, it is an old technique which originated in the Middle East. It dates from 1322 when a sponge was used to collect semen from a thorough bred Arabian Stallion. Centuries later, a milestone was reached when the frozen semen method was introduced, thus facilitating a wider usage of AI.

In Lesotho, the projects did not use AI. Recently however, the use of AI has become more common and the extension support by the Canada/Lesotho Dairy Development Project is to further strengthen and popularize its use. During the 1987/88 agricultural year, a total of 542 dairy cows were bred by the Livestock Division using AI. The key factors which render AI preferable over bull service as advanced by Loubser (1986) and Monts'i, the Chief Dairy Officer in conversation, are:

(i) it is an efficient technique of herd improvement since a single bull can procreate between 500 and 8000 progeny per annum compared to a progeny of 30 to 40 per annum that can be achieved through natural servicing;

(ii) that it allows the most efficient means of controlling the spread of venereal diseases within the herd and between herds under different management;

(iii) it is an economical method of breeding since it eliminates the need for purchasing expensive bulls, their maintenance and their loss through deaths and other hazards;

(iv) the breeding value of a bull used to produce AI semen can be determined at an early stage of growth while a similar exercise is not easy through natural servicing;

(v) it facilitates accurate record-holding and a high level of management, resulting in a high degree of efficiency. Whereas with natural servicing, it is conceivable to have cows bred without knowledge of the herd manager, AI eliminates that possibility;

(vi) it provides a wide choice of semen from different bulls while it is not economically feasible to keep a number

of bulls for natural servicing;

(vii) since proven bulls are seldom sold, AI facilitates improved breeding based on frozen semen available world-wide. The geographical location of farmers does not limit their choice of desired bull type since semen is easily transferred world-wide from reputable breeders;

(viii) while the life span of bulls may be short, the semen of exotic bulls can be stored for years and be used for subsequent breeding programmes;

(ix) it also tends to minimize the possibility of inbreeding hence checking against the spread of undesirable characteristics in a herd.

3.6 Market Development

Rural area based milk producers only have access to informal market channels. The arrangements involve sale of milk directly from the farm to the consumer. The buyers are predominantly individuals and to a lesser extent the institutions in neighbouring areas. Under the arrangements, milk is sold fresh as well as in a sour form. Under normal circumstances sour milk tends to be sold at a higher price. The price difference accounts for the loss incurred by farmers during the natural fermentation of milk. Ordinarily, the highest loss is incurred during summer when a significant amount of milk solids separate from whey.

While perhaps there are no short-term problems in the disposal of milk, in the long-run the market is liable to glut. Besides the potential threat of long-term excess supply, the seasonal variation in demand also poses problems to a small farmer in the rural areas. Long distances from the dairy plant and from the milk cooling and collection centres also impose limitations which are counter productive and constrain expansion of farm units.

Experiences from other countries, such as Tanzania, where on-farm cheese making is practised are positive lessons to follow. In Tanzania, farmers in the remote areas where transportation is difficult were trained in on-farm cheese making which expanded their product line. Primarily, the areas affected were mostly in the highlands and this is relevant for Lesotho since the largest proportion of the country comprises of Foothills and Mountains.

The advantages derived from on-farm cheese making are many. The frequency of deliveries to the dairy plants and collection centres are minimized and so transportation costs are low. This approach enhances market development through the expansion of product lines handled by the farms. A flexibility is built in through the marketing of a product which is not bulky but is of high value. Financing of this alternative market development has neither been explored by the agricultural development projects in Lesotho, nor by the government.

3.7 Short-run Versus Long-run Objectives

As delineated earlier, the revolving fund schemes became a common practice for area based agricultural development projects for the generation of reproducible funds to be made available for use by the farmers in their respective project areas. In general, the schemes are intended to provide contingency funds to pre-finance shortfalls experienced by farmers. The funds are normally disbursed through associations and cooperative organizations for repayment at future dates.

In a quest to search for long-term development initiatives, and the implications of the revolving fund programs operated by the short-term projects, an evaluation of the common features are warranted. Three common features which pose problems are identified as follows: firstly, the schemes were operated by foreign funded development projects which had their own staffing

requirements and financial resources; secondly, government involvement was limited to the broader issues leaving the projects to operate autonomously and set their goals within the short-term horizon of the project period. Finally, direct participation and representation of the farmers is limited, and this leads to the farmers being left in ignorance when the projects assistance stops.

The main problem which resulted from the aforementioned features was discontinuity of the schemes. Upon completion of project activities, which normally take five years, the farmers ordinarily lose access to the revolving fund schemes. Usually the successes of the projects are judged on the basis of their activities during the operational period with less attention to the long-term implications and sustainability.

Some farmers might be fortunate enough to take part in follow up projects implemented in their locations. But this is not often the case. In the circumstances, where subsequent projects are established, the management and or donors' approach and objectives often differ from the original project. Time elapses before harmonious working relations can be established with farmers. These experiences are not peculiar to dairy farmers, but to the overall farming communities with projects' experience.

The government is now aware of, and responding positively to some of these concerns. A striking effort has been demonstrated by the Local Initiatives Support Project. The Project and government have attempted to rationalize the short-term and long-term imbalances in financing. The strategy involves generating funds along the traditional lines so that sustainability can be achieved after termination of the project.

The problems encountered by the farmers differ at the various interfaces of the projects which service them from the onset. When the projects are introduced, farmers are often apprehensive and find it difficult to accommodate the various ideas which are often unfamiliar. Taking dairy farmers as an

example, adopting new husbandry and management practices may be done with restraint and uncertainty.

Social values, which are often linked to cultural ones, are some of the important elements which play a significant role. It is common knowledge that peasant livestock owners do associate infections, for example, mastitis, with witchcraft and not with bacteria which is unknown to them. These values are part of the society and have developed and been institutionalized through history. It is, by inference, argued that a system that is meant to bring about change should be gradual and reassuring to the farmers.

Farmers are accustomed to production systems which are primarily subsistence, but efficient given the available means of production. Returns are low but consistent with the available resources at the farmer's disposal. While the daily average milk production for indigenous cows is a fraction of a litre, exotic cows under proper management produce in the region of 20 litres but the risk involved is higher.

The intended change should provide some assurance concerning the provision of basic subsistence needs of the society, which could be provided by, for example, the traditional cows. Secondly, the question of minimum risk is essential in the long-run. These two factors have a strong bearing on any new developments which are unfamiliar to traditional farmers who are still limited to the use of indigenous means of production. The problem with projects-led development is that the life time of the projects is too short to comprehend fully, the motivations of the subsistence farmers. The projects' services tend to terminate before the farmers can fully institutionalize the new skills acquired.

As time progresses farmers do adapt and, among other things, purchase improved cows using the revolving fund schemes; gradually replace their non economic stock; get familiar with the use and the importance of feed supplements for dairy breeds; and make use of the veterinary services to control some

of the common infections, for example, clinical mastitis, and engage in tick control. In order for this stage to be reached, the enterprises should be profitable for the farmers. But the time needed to institutionalize the new methods of production goes beyond the short period for which projects extend. In the circumstances, the aspirations of farmers are cut short before realization of potential benefits.

3.8 Promotion of Small Scale Dual Purpose Animals

In the absence of processing and packaging facilities in the rural areas, it remains imperative that farmers should continue to embark on less specialized milk production units, at least in the short-run and the foreseeable future. Milk is a highly perishable agricultural product whose shelf life is short, even in its processed form. Technical advances have been achieved through production of UHT milk[1]. Advances of these nature allow for a prolonged storage life of milk. But these technological advances at present prove expensive, and are limited by human and capital investment in Lesotho.

While cold winters do increase the shelf-life of milk, it cannot be a dependable market enhancement variable given that the storage facility becomes even more critical in summer. It is generally in summer when the cows are more productive since the farmers improve feeding and, perhaps more significantly, the market for unprocessed milk shrinks significantly due to availability of competing food products, such as vegetables.

The cooling facility and the immediate delivery of milk to the processing plant become very important marketing requirements. However in the Mountain areas of Lesotho, transport is problematic and limits the prospects for the timely marketing of milk. The rational approach is to limit Mountain

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[1]The acronym, UHT milk, is normally used to refer to milk treated with ultra high temperature.

areas to management of dual purpose animals, the Brown Swiss cows, rather than exotic friesian breeds. In order to elucidate this, critical marketing functions which are directly connected with a given level of production systems and discussion of the effect of temperature on bacterial multiplication in milk will be a useful exercise.

3.9 The Effect of Temperature as a Marketing Constraint for Milk

Milk is a good breeding medium for microorganisms, and bacteria are present immediately after milking the cow. Naturally, the level of bacterial count in milk initially depends on the milking method and the standard of hygiene.

Table 3.1 demonstrates the effect of different levels of temperature on bacteria in milk. When bacteria are placed in new surroundings, for example a milking can or tank, a certain time is required for them to acclimatize to the new environment before they can start multiplying. That time is referred to as the lag phase, presented in hours in the table. After acclimatizing to the environment, the bacteria begin to split and multiply continuously at regular intervals. The time taken between each doubling and the next is referred to as the generation time, also presented in hours in the table.

The two variables, lag phase and generation time, are crucial in production and marketing in that if temperature or weather conditions are exogenous, the variable through which farmers can control the bacterial multiplication and also the shelf-life of milk, is through cooling and finally pasteurization.

As documented in the table, at higher temperatures, for example 37°C, the lag phase is shorter (0.75h) as is the generation time (0.45h), and both gradually increase as the temperature levels decrease. While milk cooling is an effective means of controlling bacteria, pasteurization is a more efficient means of storage in marketing a product such as milk. The ideal

temperature for the storage of milk is 4°C. Temperatures below 4°C result in freezing while high temperatures provide a suitable breeding environment which accelerates the deterioration of milk.

Table 3.1 The Effect of Temperature on the Lag Phase and the Generation Time

Temperature °C	Lag Phase (hrs)	Generation Time (hrs)
37	0.75	0.45
30	3	0.5
21	6	1
10	12	5
5	68	11.5

Source: Drogemoller, (1980)

Chapter IV

LIVESTOCK DATA AND EVIDENCE

In the previous chapters, an attempt was made to address the dairy components of the area-based development projects. In this chapter a special attempt will be made to present the national data on dairy farming from a survey which was conducted in 1985. The broad survey focusing on production, utilization and marketing of livestock and livestock products was conducted by Swallow, Motsamai, Sopeng, Brokken and Storey. The main results of the survey were published in 1987.

For the purpose of this study, analysis is limited to data on a few aspects of livestock, emphasizing the dairy component. The data presented below will be updated by the ongoing (Mochebelele, 1990) study, which other than addressing the diverse livestock sector broadly, is by design and focus geared to address the dairy subsystem as a specialized component of the broad livestock sector.

The subject matter treated in the chapter highlights the statistics of educational background, income sources, family size, the regional distribution of farmers, the zonal distribution of dairy cows by breed, and wage incomes of household heads.

4.1 Household Data, Distribution and Acquisition of Cows

4.1.1 Educational Background

The educational background of a nation is one of the most important indicators for the actual and potential level of development of a country. In this survey, livestock farmers and their children were asked the highest standard of education attained by them. Also, they were asked if any member of the

family had attended an agricultural college. Out of the 537 households interviewed, only one male had an agricultural college education.

From table 4.1, it can be seen that 50.9 per cent of the households fell into education group Standard 1-6, 20 per cent had Standard 7 and only 1 household in the less remote zone had a higher education which might be attributed to that one of agricultural college education. The results are very similar to those from the household budget survey concluded by the Bureau of Statistics (1988). The household budget results indicated that 52.8 per cent of the population had formal education within Standard 1 to 6 while 22.9 per cent had no formal education.

Table 4.1 Education of Household Heads by Zone

	No of Respondents							
Zone	std1-6	std7	form c	higher Education	Unknown	no school	total	%
N 11	51	4	2	0	9	30	96	17.9
S 11	59	8	1	0	6	15	89	16.6
F hill	38	4	1	0	4	42	89	16.6
Senqu	49	2	1	0	3	38	93	17.3
Remote mt	33	1	0	0	1	42	77	14.4
Less rem	43	1	2	1	3	42	92	17.2
Totals	273	20	7	1	26	209	536	
%	50.9	3.7	1.3	0.2	4.9	39		100.0

Missing Cases = 1

Note: N 11 - Northern Lowlands
S 11 - Southern Lowlands
F hill - F hills

4.1.2 Distribution of Cattle and Ownership Patterns

Table 4.2 shows that only 10 per cent of households out of 512, owned improved cattle breeds. Formal education does not seem to play a significant role in determining whether individuals who attained higher education are more likely to

engage in dairy farming. This suggests on-farm training for farmers is crucial and the only option left for the majority of farmers who lack formal education.

Out of 261 households that had Standard 1-6 education, 29 households owned improved cattle breeds, out of 20 household heads that fall under Standard 7 education category, only 2 owned improved breeds (table 4.2). Out of those six with Form C education, only one owned an improved breed. Under the unknown education category, 3 out of 21 owned improved breeds. Lastly, under no schooling category, 15 households out of 184, owned improved cattle.

FAO (1980) estimated that about half of the exotic friesian dairy cows were to be found in Maseru district. The remaining 50 per cent were scattered throughout the Lowland areas of another six districts. In 1980, according to the report, there were no credit facilities available for dairy support. The distribution pattern was biased towards Maseru district since only those farmers with sufficient capital could afford to start intensive dairy farming. This was despite the Government's objective to service and assist the rural farmers.

Table 4.2 Education of Household Head by Dairy Breeds Owned

No of Respondents

	Std 1-6	Std 7	Form C	Higher Education	Unknown	No School	Total
With Improved Breed	29	2	1	0	3	15	50
Without Improved Breed	232	18	6	1	21	184	462
Totals	261	20	7	1	24	199	512

Missing Cases= 25

Table 4.3 shows that the Lesotho cattle population is dominated by cattle of Mixed Identity (81.1 per cent) with

drakensbergers being the second. The improved dairy breeds Holstein-Friesian, Brown Swiss, and Jersey, make up only 12.1 per cent of the cattle population. Figure 4.1 presents the picture of distribution in more detail.

Table 4.3 Distribution of Cattle by Zone and Breed

	No of Cows							
	Nll	Sll	Fhill	Senqu	Remote mt.	Less Rem	Total	%
Holstein Friesian	10	6	2	2	2	3	25	3.2
Brown Swiss	1	1	2	27	4	1	36	4.7
Jersey	6	5	3	3	2	13	32	4.2
Drakensberg	0	10	18	7	5	12	52	6.8
Mixed	83	40	102	99	115	185	624	81.1
Total	100	62	127	138	128	214	769	100

Note: Remote mt- Remote Mountain Areas
Less Rem - Less Remote Mountain Areas

A focus on improved cattle alone demonstrates some interesting results. Senqu River Valley has the highest incidence of improved cattle, dominated by Brown Swiss. The Senqu River Valley Project was instrumental in bringing in the Brown Swiss to the area. As outlined earlier, the project spearheaded the promotion of dual purpose animals with meat production being the primary goal. The northern Lowlands was the second region with a higher concentration of improved cattle where Holstein Friesian ranks high.

The remote Mountain areas and the Foothills are the least populated with dairy cattle. This reflects the deliberate government strategy which spearheads dairy farming concentration in the Lowland areas for obvious reasons outlined earlier.

In terms of households who possessed improved cattle, a

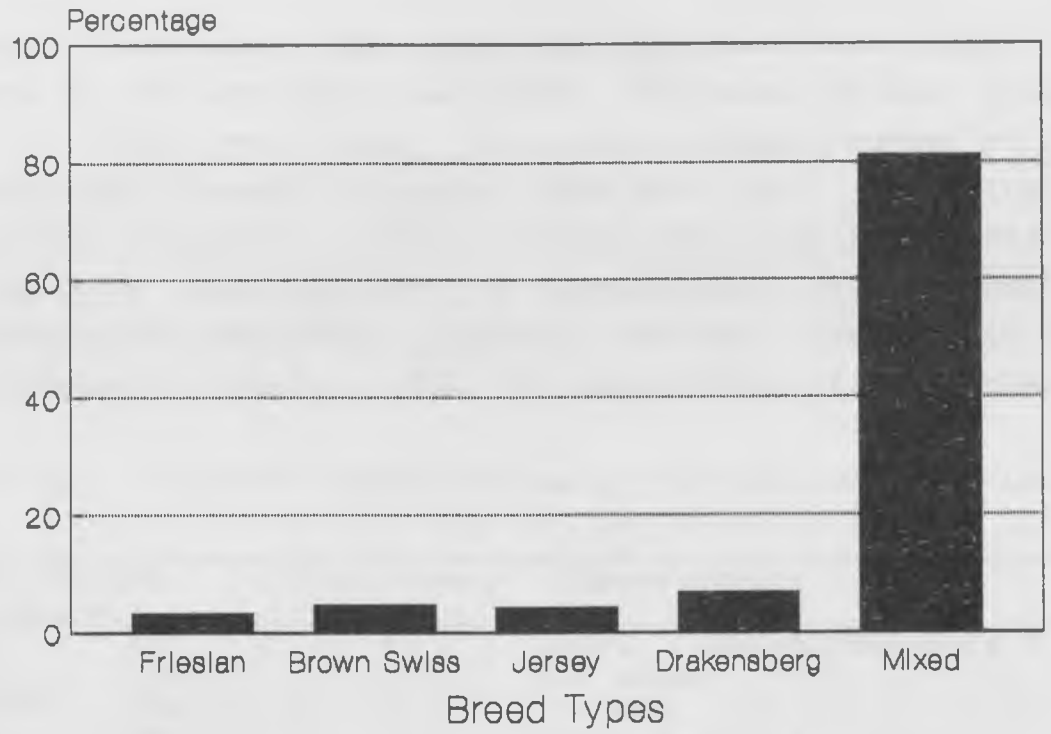

Figure 4.1 Distribution of Cattle by Breed Type

similar pattern arises (Table 4.4). Senqu River Valley had the largest concentration of households with improved breeds followed by the Northern Lowlands. On average, for the entire survey, a household managed two cows of improved breeds.

Table 4.4 Ownership of Improved Dairy Cows by Zone

	No of Respondents						
	Nll	Sll	Fhill	Senqu	Remote mt.	Less Rem	Total
With improved Cows	15	6	7	17	1	4	50
Without improved Cows	77	79	75	74	75	83	463
Total	92	85	82	91	76	87	513

Missing Cases = 24

Farmers were asked to indicate the purchase prices of their improved breeds and their place of purchase (table 4.5). The

results indicated that most of the cows were bought locally, though it was not specified where. The local prices ranged from M70 to M650 per head. The second highest number of improved breeds were bought privately from the RSA. The prices ranged from M60 to M1240. Lastly, others were bought from RSA through the help of the Ministry of Agriculture with prices ranging between M130 and M700. Clearly the data demonstrate the high dependence of Lesotho on RSA for acquisition of dairy cows.

Table 4.5 Improved Breeds Purchase Price and Place of Origin

Price Ranges (in Maloti)	No of cows	Where bought
51 - 150	9	Local 1, RSA 6, MOA Help 2
151 - 250	4	All Local
251 - 350	2	All RSA
351 - 450	3	Local 2, RSA 1
451 - 550	7	Local 5, MOA Help 2
551 - 650	2	Local 1, MOA Help 1
651 - 750	1	MOA Help
751 - 850	0	
851 - 950	0	
951 - 1050	0	
1051 - 1150	0	
1151 - 1250	1	RSA
Total cows	29	

Average Price = M358 Standard Deviation =M255
Minimum Price =M60 Maximum Price =M1240

Note: MOA- Ministry of Agriculture

4.2 Household Sources of Income and Wages

The information was meant to show how many farmers depended on livestock as their primary source of income, and it was also meant to show whether the amount of income earned by these farmers was sufficient to permit them to purchase the improved cattle breeds without the need for borrowed funds (Table 4.6).

Table 4.6 Principal Sources of Cash Income

	Households % Reporting				
	Principal Source	Second Source	Third Source	Fourth Source	% reporting Source
Livestock	11.4	8.6	5.4	0.4	25.8
Livestock Products	10.8	9.7	1.9	0.6	23.0
Remittance from mines	36.9	3.5	1.3	0.4	42.1
Crops or fodder sales	7.8	6.3	4.1	0.7	18.9
Joala (sale)	4.5	21.0	10.2	3.0	38.7
Fruits & vegetables	1.3	3.2	2.4	0.4	7.3
Shop or cafe	2.4	1.7	0.6	0.4	5.1
Handicrafts	1.7	3.0	1.7	0.4	6.8
Building & thatching	6.7	3.7	1.5	0.4	12.3
Peace jobs	0.7	0.9	0.9	0.2	2.7
Chickens, eggs, pork	0.4	2.2	3.4	0.9	6.9
Farm equip stock rental	0.6	1.3	1.9	0.2	4.0
Other remitt. from RSA	1.3	0.4	-	-	1.7
Government employment	1.5	0.9	0.2	0.2	2.8
Road construction	0.6	0.6	0.4	-	1.6
Men in RSA (not mines)	1.1	0.4	-	-	1.5
Herbalist	0.4	0.6	0.2	0.2	1.4
Creche	0.2	-	-	-	0.2
Relatives	2.2	2.8	1.5	0.2	6.7
Summermill	0.2	0.2	0.2	-	0.6
Sale of soft goods	0.2	1.1	-	-	1.3
Income from hired shepherd	-	0.2	-	-	0.2
Pension money	0.7	0.2	-	-	0.9
Sale of wood	0.4	0.7	-	-	1.1
Payment of lobola(money from)	-	0.2	-	-	0.2
Food for work done	1.1	0.9	0.6	0.7	3.3
Sale of traditional tobacco	-	0.4	0.2	-	0.6
Men working in Lesotho	1.7	0.4	0.2	-	1.3
Chieftainship	-	0.2	0.4	-	0.6
Shop/butchery employee	0.2	0.2	-	-	0.4
Women working in Lesotho	0.7	0.2	-	-	0.9
No source of income	2.4	24.6	60.9	90.9	
Total	100.1	100.3	100.1	100.2	

As indicated in table 4.6, 198 (36.9 per cent) households have their main source of cash income as remittances from the mines, 11.4 per cent of households had the main source of their cash income derived from livestock sales, 10.8 per cent households from selling livestock products, 7.8 per cent households from selling crops for fodder, 6.7 per cent households from building and thatching and then 4.5 per cent from selling joala (home brewed beer) while the remaining 26.4 per cent had many other diverse sources.

Of the 50 households that indicated ownership of improved breeds, only a few households had a total monthly household wage of M100 and above. The average monthly income was M146.00. Since the wage incomes are generally low, indications are that capital should be a crucial factor for expansion. This further demonstrates the need for capital from outside the household's own income stream. This is the area where development projects are useful in helping farmers to acquire funding. The credit scheme which was operated by the Senqu project in particular may have been very successful as the concentration of Brown Swiss cattle proves.

Table 4.7 Total Monthly Household Wages of Farmers Engaged in Dairy Farming

	Wages (Maloti per Month)								
	0	13	20	30	177	200	232	240	380
No of HH	30	1	2	1	1	1	1	1	1
Percentag	76.9	2.6	5.1	2.6	2.6	2.6	2.6	2.6	2.6

Average Wage Earning = M145.77/month

Note: HH- Households

4.3 Milk Production, Pricing and Marketing

The survey results showed a very small incidence of milk sales. This result may have been influenced by the time at which it was carried out - July and August. Of the 537 households, only 15 reported selling milk the previous year. Twelve of them sold milk daily, two sold weekly while the last two sold milk 4 times a week. The selling prices of farmers differed significantly with the average of 42c per litre and a standard deviation of 15c. It is conceivable that this was a result of differences in demand or area of residence of the farmer and other prevailing conditions in the market, such as costs of feed and maintenance.

Table 4.8 Milk Sale Prices

Price/litre (Maloti)	No of HH	Percent
0.15	1	0.2
0.20	2	0.4
0.30	3	0.6
0.40	1	0.2
0.42	1	0.2
0.45	1	0.2
0.47	1	0.2
0.50	2	0.4
0.60	2	0.4
0.65	1	0.2
	15	100

Average Price = M0.42 Std. Dev = M0.15

Missing Cases = 522

In the northern Lowlands, there was a wider variability in prices from 15c per litre to 65c per litre. But the average price was equal to the overall sample mean, 42c. The opposite was evident in the Southern Lowlands, the Foothills and Senqu

zones. The prices tended to be clustered together at the higher levels, averaging 50c per litre respectively. For the remote Mountain areas, the average price was lower than the sample mean, perhaps indicating that sale of milk, was not done with a clear motive of making high returns. It is further conceivable that market knowledge and information dissemination differed significantly amongst the farmers zonally. In a forthcoming study (Mochebelele, 1990), information was solicited in order to establish the basis for different pricing strategies adopted by farmers.

The data also indicate that milk production in rural areas is rather low. Thirty per cent of the households owning improved cows sold milk. In other words, it is evident that production was primarily for subsistence. Most of the milk was sold to friends and neighbours and only one household sold to the dairy plant suggesting a high dependence on informal marketing channels.

Farmers who did not own milk cows were asked whether they purchased milk the previous year. More than a third of the respondents (203) reported buying milk the previous year. Frequency of purchasing differed markedly according to the family needs, size and availability of cash income. Most of the milk was bought at local cafes. The second area of purchase was from friends or neighbours, and, lastly from supermarkets. Detailed milk purchasing patterns are presented in table 4.9.

Table 4.9 Frequency of Milk Purchases

Frequency	No of HH	%
Daily	51	27.6
Weekly	45	24.3
Monthly	23	12.4
Occasionally	10	5.4
Thrice per week	21	11.4
Every Fortnight	4	2.2
Every 4 Days	1	0.5
Six times a Month	2	1.1
Once Yearly	7	3.8
Thrice a Month	9	4.9
Every other day	1	0.5
Once in 3 Months	6	3.2
Thrice a month	1	0.5
Once in six Months	3	1.6
Four times a Week	1	0.5
	185	100

Missing Cases = 352

4.4 Fodder and Supplement Feed Usage

In response to the source of purchased feeds, 81.2 per cent of farmers indicated buying from towns. The rest bought from different places, such as the same village, a nearby village, and shops, including Co-op Lesotho stores. The types of fodder used differed. Amongst the types of fodder purchased were barley and lucerne. Maize stoffer dominated the ration with approximately 50 per cent of farmers using it (table 4.10).

Slightly less than 44 per cent of the households fed lactating cows one bundle of fodder daily, 20.7 per cent 2 bundles, 12.2 per cent 3 bundles (table 4.11). Further evidence (table 4.12) shows that the frequency of feeding cows was generally low, and approximately 84.5 per cent of the farmers either fed the cows once or twice a day. It can be safely concluded on the basis of tables 4.11 and 4.12 that most households relied heavily on grazing as opposed to stall feeding.

Table 4.10 Type of Fodder Fed to Lactating Cows

Fodder	No of HH	Per cent
Barley	32	16.3
Lucerne	5	2.6
Maize stoffer	98	50.0
Stoffer	2	1.0
Weeds	9	4.6
Litlhaka+Pennicum	27	13.8
Lucern+Pennicum	3	1.5
Stoffer+lucerne	10	5.1
Barley + oats	1	0.1
Barley + litlhaka	9	4.6
Total	196	100.0

Missing Cases = 341

Table 4.11 Amount of fodder fed to lactating cows

No. of bundles	No of HH	Per cent
1	72	43.9
2	34	20.7
3	20	12.2
4	22	13.4
5	6	3.7
6	1	0.6
8	2	1.2
9	1	0.6
10	3	1.8
11	1	0.6
12	1	0.6
15	1	0.6
Total	164	100.0

Missing Cases = 373

But, on the contrary, the forthcoming study (Mochebelele, 1990) has shown that a zero-grazing system is receiving wider acceptance. The recorded feeding practices suggest that the level of feeding was too low to suggest the opposite.

Table 4.13 shows the feeding of supplement feeds zonally.

The use of concentrate feeds was generally low amongst the farmers. A similar pattern emerged even amongst the dairy farmers with an average of only 7 per cent using all the concentrates in table 4.13, to the exclusion of salt which was prominently used.

Table 4.12 Frequency of Fodder Feeding

Frequency	No of HH	Per cent
1 * day	84	44.0
2 * day	85	44.5
3 * day	15	7.9
Every 3 days	1	0.5
8 * day	1	0.5
4 * day	1	0.5
2 * week	1	0.5
Totals	188	100.0

Missing Cases = 349

Table 4.13 Number of Farmers Using Supplement Feeds Zonally

Supplement Feed	Nll	Sll	Fhill	Senqu	Remote mt.	Less rem.	Total HH
Bran	15	18	11	7	10	1	62
Dairy Meal	1	0	0	1	2	0	4
Salt	59	70	63	79	69	79	419
Ruminant Block	5	3	4	10	7	1	30
Bone Meal	2	0	0	2	0	0	4
Molasses	1	0	0	0	0	0	1

4.5 Dairy Support Services

Without properly coordinated support services, the chances of advancement in livestock improvement are limited. This necessitates strengthening the extension services and the medical assistance which are primarily of public nature. The farmers

individually acquire and use these "public goods" privately while their supply requires participation of the public sector.

Table 4.14 shows the forms of assistance that was extended to the farmers. In general, evidence suggests that extension advice was not widely used. Out of 537 farmers, only 32 (6 per cent) had been given advice by the Extension Officer in one way or another.

On the contrary, veterinary services were commonly used (Table 4.15). The most common treatment was for strangled cattle (67 per cent), followed by tick control, 31 per cent, while the treatment of mastitis and irritation of cows which had retained placenta at calving were relatively uncommon.

The low incidence of assistance acquired by farmers from extension officers is a result of many factors. Amongst the reasons are long distances from the Livestock Improvement Centres; lack of general awareness regarding the significance of veterinary services and their relevance to increased returns per animal; the high cost of veterinary services; and lack of management expertise.

Table 4.14 Type of Assistance Sought From Livestock Specialists Zonally

Type of Help	Nll	Sll	Fhill	Sengu	Remote mt.	Less Rem	Total
Vaccine Trenching	-	3	2	2	2	2	11
Advice on herd Improvement	-	-	-	2	1	1	4
Disease Treat	-	3	3	5	1	2	14
Remove retained Placenta	2	-	-	-	-	-	2
Advice on livestock	-	-	-	-	1	-	1
Total	2	6	5	9	5	5	32

Missing Cases = 505

Table 4.15 Number of Households by Type of Treatment to Cattle Zonally

ZONE	Tick	Strangles	Mastitis	Retained Placenta	Total
N ll	26	61	1	0	88
S ll	23	57	3	0	83
F hill	32	49	0	1	82
Senqu	18	65	1	0	84
Remote mt.	22	49	0	1	72
Less Rem	34	51	0	0	85
Total	155	332	5	2	494

Missing Cases = 43

Chapter V

CONCLUSION AND RECOMMENDATIONS

In Lesotho, dairy farming support has been extended through two major scenarios. The first scenario involves extension support which is based on the area-based agricultural development projects. The second mode of support, which is gradually being strengthened, is facilitated through the direct involvement of the government.

An assessment of the role played by agricultural development projects has been made. Clearly, this mode of support was a subject of many problems. It was difficult to get concrete data on the projects but a number of issues have been outlined. In general, the successes of the projects could only be traced to the period during which they were operational. Alternatively, it can be argued that there has, as yet, been no balance between the short-term successes and the long term successes and objectives which would ensure sustainability. The main reason for this imbalance has been outlined as being the autonomous atmosphere within which most development projects operated. The projects' short-term targets have not been complementary to the long-term national objectives which sought self-sustainable dairy farming.

From another perspective, the mistakes did not rest entirely with the projects. Rather, the Ministry of Agriculture also lacked personnel to coordinate the activities of projects. The plan to strengthen the dairy extension services nation-wide, has yet to be realized. The awareness about the need to closely monitor and coordinate dairy activities is growing. Of late, the projects are using the services of the Livestock Division to conduct dairy training courses consistent with the broad policy initiatives.

Whereas the development projects have been instrumental in shaping the dairy development, it is argued that a clear procedure for selection of projects is imperative. It seems that

a potential for long-term development would be more feasible if projects supporting dairy industry are more specialized in nature. This suggests that such projects should only promote dairying and develop relevant support institutions which would facilitate an increased production base and marketing.

The projects should take the form of the Canada\Lesotho Dairy Development Project which because of its specialized nature, has had a more consistent impact. Other projects which are area-based and multi-functional tend to suffer from lack of systematic planning, and a lack of trained dairy personnel, and are characterized by more autonomy, and less systematic coordination by the Dairy Section of the Livestock Division.

In view of the high marginal propensity to consume, the smallholder farming prospects for expansion are limited.[2] They lack the potential to make sufficient savings and reinvestment in farming. While borrowing provides an alternative, it has been shown that, in general, there is a tendency to rely on a person's own capital rather than borrowing. Besides this natural tendency, credit worthiness is a constraint on a small farmer aspiring for expansion.

The alternative credit schemes operated on a project basis eased the capital constraints of the smallholder. But, as with the overall project assistance, the credit schemes fell short of continuity, a factor which is not in favour of long-term sustainable dairy farming.

It is imperative that revolving fund schemes should be widely supported by the projects in a manner that involves the target group of farmers and have more input from government. Grass roots capital raising functions along the lines promoted by LISP have a room for improvement.

Understandably, the success of AI, a new breeding method in Lesotho, depends greatly on proper administration and

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[2] The marginal propensity to save is low due to the low average incomes and extended family structure.

coordination. Its benefits, however, evidently warrant expanded use for the purpose of improving the herd quality and returns to the farmers engaged in dairy farming. A campaign is necessary to sensitize farmers about the benefits of improved breeding based on selected bulls.

It was evident from the data that crossbreeding is not an unusual practice. The herds are dominated by cattle of mixed origin. On the positive side, the government has embarked on a policy that spearheads pure breeds and discourages cross breeding. It is argued that farmers with little prior exposure to dairy farming make progressive farmers. As outlined in this document, female farmers dominate the group with less preconceived ideas about management and husbandry. In a way, the success of the smallholder dairy farming is highly dependent on the increased participation of women.

Since women are seen to be a viable resource for the success of dairy industry, it is equally important to reorganize the institutional set up. Women are often regarded as minors, and this limits their chances of improvement and full participation in development. Amongst the constraints they encounter are the legibility for loans from the financial institutions. Again, since the reorganization of institutional constraints is a long-term issue, alternative funding schemes free of prohibitive demands have to be supported.

As mentioned in the document, milk provides a suitable medium for bacterial multiplication. This renders milk as a highly perishable product. Necessarily, the expansion of the national dairy farming should be made with caution. Efforts should continue to be directed to the Lowlands while a different policy should be pursued in the highlands. The dual purpose animals are suitable for the highlands in order to avoid milk marketing constraints. In order to improve the marketing channels, more milk collection centres are desirable in the Lowland districts. To ease the burden on the government, it is desirable that the milk collection centres be operated on a

private basis by farmers.

The high dependence on a supply of improved cows from the RSA is a disturbing factor. The unfavourable exchange rate of RSA rand, and inflation, have led to a rapid price increase which makes entry increasingly difficult for prospective dairy farmers. It is imperative that sources of supply need to be diversified. An inward looking strategy based on local breeding units is desirable in order to ensure sustainability of the industry, and to avoid drainage of capital. This should be consistent with the widely proclaimed government policy of self-sufficiency.

A number of direct policy instruments, including grazing fees, have been on the government agenda in order to facilitate the destocking programme. It is the contention in this research that, with increasing use of a zero-grazing system, dairy farming should be an acceptable and effective means of destocking amongst the farmers. To do this, farmers need to be encouraged to make a trade-off between their less productive cattle for a few but more productive dairy animals. Doing so releases the pressure on credit which is required to purchase cows. It is rightly observed by Combs and Hunter (1987, p XII) that "as the most regularly consumed animal product, milk has not received sufficient attention in livestock plans."

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